

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application

1-18. Canceled.

19. (Previously Presented) The method of claim 40, further comprising the step of winding the pipe on a reel after placing and curing the compound.

20. (Previously Presented) The method of claim 40, wherein the axial length of the annular region is in the range of 0.5 to 2 times the external diameter of the carrier pipe.

21. (Previously Presented) The method of claim 40, wherein each of the sealing blocks is comprised of a material which is radially deformable when compressed axially and further including the step of axially compressing the sealing blocks to conform the radially outer margins thereof to the shape of the respective inner and outer walls of the carrier pipe and the flow pipe.

22. (Previously Presented) The method of claim 21, further comprising installing a rigid bearing plate to bear against at least one lateral side of each of the sealing blocks.

23. (Previously Presented) The method of claim 22, wherein the bearing plate has a radial dimension that is less than the radial dimension of the annular space.

24. (Previously Presented) The method of claim 23, wherein:
the bearing plate is fastened to the outer wall of the flow pipe,
the bearing plate has a radially outer free edge and is so dimensioned as to define a gap between the free edge of the bearing plate and the inner wall of the carrier pipe.

25. (Previously Presented) The method of claim 24, wherein the bearing plate is made of metal.

26. (Previously Presented) The method of claim 21, wherein:
at the time of assembly, each sealing block has a radial dimension less than the radial dimension of the annular space; and further including the step of
subsequent to assembly, radially expanding the sealing block to bring its radially opposite faces into tight contact with the outer wall of the flow pipe and the inner wall of the carrier pipe.

27. (Previously Presented) The method of claim 40, wherein the curable compound is an epoxy resin.

28. (Previously Presented) The method of claim 40, further including the steps of:
providing an injection orifice through the wall of the carrier pipe into the annular region; and
injecting the curable compound into the annular region through the orifice.

29. (Previously Presented) The method of claim 28, wherein the curable compound is a thermosetting compound.

30. (Previously Presented) The method of claim 28, wherein the curable compound is curable at room temperature.

31. (Previously Presented) The method of claim 29, further comprising the steps of:
reeling the rigid pipe onto a reel after assembly but before placing the curable compound in the annular region;
unreeling the rigid pipe from the reel,
injecting the curable compound into the annular region after the pipe has been unreeled, and
heating the annular region to accelerate the curing of the curable compound.

32. (Previously Presented) The method of claim 40, further comprising the steps of:
reeling the rigid pipe onto a reel after assembly but before placing the curable compound in the annular region;

unreeling the rigid pipe from the reel,
placing the curable compound the annular region after the pipe has been unreeled, and
heating the annular region to accelerate the curing of the curable compound.

33. (Previously Presented) The method of claim 32, wherein the annular region is heated by passing it through a heater.

34. (Previously Presented) The method of claim 33, further comprising the step of straightening the pipe before heating the annular region to cure the compound.

35. (Previously Presented) The method of claim 34, wherein:
the pipe is straightened in straighteners in a pipe laying vessel; and
the annular region of the pipe is heated in a heater mounted after the straightener on the vessel along
the path of movement of the pipe; and further including the step of
moving the pipe from the reel through the straighteners and past the heater.

36. (Previously Presented) The method of claim 40, wherein the curable compound has a pot life in the range of a few minutes to a few weeks.

37. (Previously Presented) The method of claim 40, further comprising the steps of:
winding the pipe onto a receiving reel after placing the curable compound in the annular region;
transporting the reel carrying the pipe to a site for use of the pipe, and
unwinding the wound pipe from the reel at the site for use.

38. (Previously Presented) The method of claim 37, wherein;
the curable compound is introduced into the annular region while the pipe is on land,
the receiving reel is located on a pipe-laying vessel, and
the wound reel is transported on the vessel to the site for laying of the pipe.

39. (Previously Presented) The method of claim 34, wherein the curable compound is placed in the annular region after the pipe has been straightened.

40. (Previously Presented) A method of manufacturing a reelable double-walled rigid pipe for underwater transportation of fluids, wherein the pipe comprises an inner flow pipe, the interior of which defines a passage for transporting the fluid, an outer carrier pipe which surrounds the flow pipe, and a plurality of longitudinally spaced separating elements between the inner and outer pipes which define an annular space therebetween, which is capable of arresting longitudinal propagation of buckling of the outer carrier pipe, the method comprising:
selecting dimensions and properties of the inner pipe and the carrier pipe according to an intended fluid transportation application, and an intended pipeline location, and to have suitable mechanical properties which permit the double walled pipe to be plastically deformed for reeling on a vessel reel and then straightened while being laid offshore;
assembling a double walled pipe using the selected carrier and flow pipes, and the separating elements, and also including at least one pair of sealing blocks axially spaced apart between the outer wall of the flow pipe and the inner wall of the carrier pipe;
the sealing blocks having radially opposite faces and being dimensioned to be in contact respectively with the outer and inner walls of the flow pipe and the carrier pipe, to define a sealed annular region within the annular space;
spacing the sealing blocks so that the axial length of the annular region is at least equal to 0.5 times the external diameter of the carrier pipe;
placing a curable compound in the annular region; and
curing the compound in the annular region.

41. (Previously Presented) A method of claim 40, wherein the step of assembling the double walled pipe further comprises including therein a plurality of pairs of axially spaced sealing blocks, thereby defining a plurality of annular regions.

42. (Withdrawn) A reelable double-walled rigid pipe for underwater transportation of fluids which is capable of arresting longitudinal propagation of buckling of the outer pipe comprising:

an inner flow pipe, the interior of which defines a passage for transporting the fluid;
an outer carrier pipe which surrounds the flow pipe,
dimensions and properties of the flow pipe and the carrier pipe being selected according to the intended application and to provide mechanical properties which will permit the double walled pipe to be plastically deformed for reeling on the vessel reel and then straightened while being laid offshore;
a plurality of longitudinally spaced separating elements between the inner and outer pipes which define an annular space therebetween;
at least one pair of sealing blocks axially spaced apart between the outer wall of the flow pipe and the inner wall of the carrier pipe,
the sealing blocks having radially opposite faces and being in contact respectively with the outer and inner walls of the flow pipe and the carrier pipe, to define a sealed annular region within the annular space,
the sealing blocks being spaced so that the axial length of the annular region is at least equal to 0.5 times the external diameter of the carrier pipe; and
a curable compound disposed in the annular region.

43. (Withdrawn) The pipe according to claim 42, wherein the axial length of the annular region is in the range of 0.5 to 2 times the external diameter of the carrier pipe.

44. (Withdrawn) The pipe according to claim 42, wherein:
each of the sealing blocks is comprised of a material which is radially deformable when compressed axially; and
the sealing blocks are compressed axially to conform the radially outer margins thereof to the shape of the respective inner and outer walls of the carrier pipe and the flow pipe.

45. (Withdrawn) The pipe according to claim 44, further comprising a rigid bearing plate positioned against at least one lateral side of each of the sealing blocks.

46. (Withdrawn) The pipe according to claim 45, wherein the bearing plate has a radial dimension that is less than the radial dimension of the annular space.

47. (Withdrawn) The pipe according to claim 46, wherein the bearing plate:
is fastened to the outer wall of the flow pipe;
has a radially outer free edge; and
is dimensioned to define a gap between the free edge of the bearing plate and the inner wall of the
carrier pipe.

48. (Withdrawn) The pipe according to claim 47, wherein the bearing plate is made of
metal.

49. (Withdrawn) The pipe according to claim 42, wherein the curable compound is an
epoxy resin.

50. (Withdrawn) The pipe according to claim 42, further including an injection orifice
through the wall of the carrier pipe into the annular region through which the curable compound is
placed into the annular region.

51. (Withdrawn) The pipe according to claim 50, wherein the curable compound is a
thermosetting compound.

52. (Withdrawn) The pipe according to claim 50, wherein the curable compound is
curable at room temperature.

53. (Withdrawn) The pipe according to claim 42, wherein the curable compound has a
pot life in the range of a few minutes to a few weeks.

54. (Withdrawn) The pipe according to claim 42, wherein there are a plurality of pairs of
axially spaced sealing blocks, which respectively define a plurality of annular regions.